

SECTION 7: Waste Management

Principles

- Source reduction, or the avoidance of generating waste, is the most effective way to reduce GHG emissions associated with waste.
- Because energy is needed to transport and process wastes, recycling reduces but does not eliminate GHG emissions associated with wastes.
- Environmental purchasing is key to establishing and supporting the demand for recycled materials in products.

Role of Waste Generation and Management in Cambridge

The typical municipal solid waste stream consists of a variety of materials including paper products, metal, glass, plastics, food scraps, and landscape trimmings. These are collected by the Department of Public Works or by private disposal firms and sent to landfills and incinerators located outside Cambridge. Other types of waste including construction debris and appliances are also landfilled. Hazardous wastes are handled by special facilities.

Waste materials are related to GHG emissions in the following ways:

- The unmanaged decomposition of organic material (e.g., food scraps, landscape trimmings, paper, cardboard) in landfills releases methane, a powerful GHG (20 times more potent than CO₂). Increasingly, scientists are finding that the release of methane is a major component of global climate change.
- Incineration of solid waste results in the emission of CO₂ and other pollutants.
- Energy, usually in the form of fossil fuels such as gasoline and diesel, is used in the collection, transport, and handling of waste materials, which in turn releases CO₂.
- Some wastes, when landfilled, sequester or store carbon because they do not decompose. This keeps CO₂ out of the atmosphere.

In Cambridge, the City collects most residential waste. About 94% of households are served by the City's recycling program whether they are on City trash service or not. Some multi-residential dwellings use private waste contractors. The City collects recyclable materials, including paper, cardboard, metal, yard waste, and plastic from residences and City government buildings and schools. Currently, Cambridge recycles about 33% of its solid waste. Businesses are also required under the Cambridge Recycling Ordinance to develop and implement a recycling plan. The City's curbside recycling contractor services over 100 small and medium-sized businesses in a City-subsidized commercial curbside program. Most businesses utilize private contractors. Businesses with fewer than 50 employees can use the City's drop-off center at no cost.

Actions that prevent or reduce the generation of waste—efficient use of resources, reuse, composting, and recycling—also prevent or reduce the emission of greenhouse gases. In this plan, preventing the emission of greenhouse gases at landfills and incinerators and the sequestration of carbon in landfills are considered. While not counted in this plan, waste minimization and prevention also prevent and reduce the use of energy in mining, transportation of raw materials to mills, production of goods, and transportation of goods to consumers. Preservation of forests, by reducing the demand for wood products, allows trees to continue removing CO₂ from the atmosphere and storing it in a process called carbon sequestration.

Trends

Various initiatives undertaken during the 1990s, particularly the establishment of the Cambridge recycling program in 1990, have achieved significant reductions in GHG emissions from waste. Since 1990, annual GHG emissions have been reduced by 14,343 tons. The table below summarizes trends in residential solid waste generation and recycling since 1990.

It is difficult to develop a full picture of solid waste management in Cambridge because there is not a unified system for the collection, recycling, and disposal of all waste.

While the City collects most residential waste, some is collected by private contractors. We can have relative confidence in the figure for the total volume of material that residents recycle, but we do not have a handle on how much material businesses recycle. Therefore it is not possible to calculate the total volume of material that is recycled in Cambridge.

Cambridge Curbside Recycling Statistics

	FY 1990	FY 1998	FY 1999	FY 2000	FY 2001
Trash Collected	40,424	22,361.45	21,606.79	21,671.53	21,806.61
Curbside recyclables	0	8,976.92	8,903.47	9,749.99	9,648.38
Drop-off recyclables	0	163.90	171.70	175.95	195.5
Home composting	0	619.13	670.88	744.38	794.63
Other waste	0	8.6	8.3	8.0	35.03
Total recycled	645.6	9,847.35	9,831.27	10,759.11	10,866.23
Total solid waste	41,069.6	32,208.8	31,438.06	32,430.64	32,672.84
Population	95,802	99,772	99,772	101,355	101,355
Per capita trash generated	0.4985	0.2648	0.2559	0.2526	0.2542
Per capita recycled	0.0067	.09870	.0985	0.1062	0.1072
Per capita Solid Waste	0.5065	0.3721	0.3626	0.3680	0.3706
Recycling rate	.57%	30.57%	31.27%	33.18%	33.26%

Relationship between Waste and GHG Emissions

After products and materials have served their useful life, they are sent to landfills and incinerators for disposal. At landfills, wastes with organic constituents give off methane, a powerful GHG, as they decompose. At incinerators, burning of some kinds of waste produces CO₂, among other pollutants.

Strategies to Reduce GHG Emissions from Waste

Waste Minimization and Prevention

The generation of waste can be minimized and prevented by using materials more efficiently and by extending the length of use to avoid replacement. Even small steps, like making two-sided copies, can add up when a lot of people take them.

Reuse of Products

Reusing products and materials extends the usefulness of these items and prevents sending them to landfills and incinerators. Examples include recovery and reuse of building materials such as windows, wood beams, doors, and cabinets in construction.

Recycling of Materials

Recovering materials to reuse in the production of new goods—recycling—prevents disposal in landfills and incinerators. Some materials that the recycling program collects, such as glass or metal, do not generate greenhouse gases if they are disposed of in a landfill or incinerator, but recycling them prevents the use of energy in mining virgin materials and producing and transporting products. Recycling of paper products does prevent the emission of greenhouse gases, because they would generate methane if they decomposed in a landfill or CO₂ if incinerated.

Composting

Composting food scraps, instead of sending them to landfills, results in a net reduction of greenhouse gases. Composting in backyards or in central facilities does not produce methane. In a landfill, food scraps will degrade and produce methane.

Composting of yard trimmings also does not produce methane. In landfills, yard trimmings tend not to decompose and the carbon contained is sequestered, but they use up limited landfill capacity, and their potential for improving soil is lost.

Environmentally Preferable Purchasing Practices

The Commonwealth of Massachusetts defines environmentally preferable products as having less negative effect on human health and the environment than competing products or services that serve the same purpose. Such products or services may include, but are not limited to, those that contain recycled content, minimize waste, conserve energy or water, or reduce the amount of toxics disposed or consumed. Purchasing products with recycled content is necessary to support the collection of recyclable materials. Without environmentally preferable purchasing, the recycled materials would simply accumulate and would ultimately require conventional disposal.

Tools and Resources

Massachusetts Solid Waste Master Plan

The state Department of Environmental Protection is required by law to develop and maintain a statewide master plan for solid waste management. The first plan was issued in 1990 and the most recent plan was issued in December 2000. It lays out goals and mechanisms to minimize the disposal of solid waste in landfills and incinerators, using a mix of regulatory requirements, incentives, and educational programs.

The basic strategy of the plan is to reduce the amount of solid waste produced, recycle the maximum amount that is produced, and dispose of the remaining portion as a last resort in an environmentally sensitive manner. The plan calls for a 70% reduction of municipal solid waste and construction and demolition debris (60% MSW reduction and 88% C&D waste reduction). DEP proposes to achieve this milestone through

- expanding source reduction programs especially targeted at businesses;
- launching new initiatives with manufacturers to take responsibility for managing the wastes associated with their products;
- making recycling more accessible to multi-family units;
- banning the disposal of unprocessed construction and demolition waste in 2003;
- enhancing enforcement of waste bans;
- requiring recycling facilities to implement recycling benefits plans

Department of Environmental Protection/Bureau of Waste Prevention

DEP is responsible for state waste management policy. Various regulations, education programs, and incentives are used to reduce the generation and disposal of waste in Massachusetts. DEP offers a range of technical assistance programs to municipalities, businesses, and institutions and a variety of grants to support the recycling industry and municipal waste management programs.

Recycling Ordinance

The Cambridge Recycling Ordinance (Section 8.24.070 of the City Code), passed by the City Council in 1991, mandates recycling in Cambridge by:

- establishing the recycling program within the Department of Public Works;
- requiring that each owner or occupant in Cambridge separate recyclable materials;
- requiring all buildings that do not receive City solid waste collection service to prepare and implement a recycling plan. All City-owned buildings including schools must also have plans.

DPW Recycling Program

The recycling division of the Department of Public Works coordinates administration of the City's recycling ordinance. The division works with contractors to provide recycling services to residents and businesses and promotes efforts to increase the rate of recycling. The division is advised by the Recycling Advisory Committee, a group appointed by the City Manager and composed of citizens and representatives of the business and institutional sectors.

WasteCap

WasteCap of Massachusetts is a nonprofit organization that provides services to businesses across the state on recycling, source reduction, reuse of materials, and buying recycled products. Services include site visits to develop waste reduction and recycling strategies, a surplus inventory donation program, recycling cooperatives, buying recycled technical services, and a recycled paper purchasing cooperative.

Boston Building Materials Cooperative

The BBMC is a private, nonprofit consumer cooperative that takes good-quality used and surplus building materials and distributes them to low and moderate income homeowners, schools, nonprofit organizations, and churches. The value of materials donated to BBMC is tax-deductible.

Center for Ecological Technology

The Center for Ecological Technology initiated the Greater Boston Food Waste Recycling Project in an effort to divert food waste from landfills and incinerators. CET is working to identify all composting and other end users of food waste (e.g., farms and feed manufacturers) in eastern Massachusetts and to expand their capacity to accept food waste. The center will also work with generators, such as supermarkets, food manufacturers, and food distributors, to divert food waste from landfills and incinerators.

Institution Recycling Network

The network, based in Concord, New Hampshire, works to improve the financing and operations of recycling programs at New England institutions such as universities, hospitals, nursing homes, and private schools. Services provided to institutions include help in finding markets for recycled materials, arranging transportation, setting up “milk runs” for collection and marketing of small quantities of materials generated at several locations, assuring compliance with health and safety standards, and coordinating group purchases of recycling-related supplies and equipment.

ACTIONS TO REDUCE GHG EMISSIONS FROM WASTE

Note: Actions are classified based on which sectors of the community would be directly involved:

B=Business community

G=City government

I=Institutions

R=Residents

Proposed actions are listed by sector in Appendix III.

Strategy I: Prevent Waste

The most effective way to reduce greenhouse gases from waste is to prevent the generation of waste in the first place. Not only are the impacts of disposal prevented, but the cost and impacts of producing and transporting products and transporting materials for recycling are also avoided.

Proposed Actions

Short-term

- Implement a waste prevention program for City government. [G]

Medium and Long-term

- Promote waste prevention measures in the commercial sector, after having implemented a waste prevention program in City government. Finally, promote residential waste prevention. [B,G,I]

Strategy 2: Increase Recycling

The Commonwealth has raised the goal for recycling. To meet these goals, Cambridge—the City, businesses, institutions, and residents—will need to consider new initiatives to increase the rate of recycling.

Actions: 1990-2001

- Since 1990, the Department of Public Works Recycling Program has provided curbside recycling, a drop-off recycling center, and distribution of home composters. In 2001, 10,866 tons of material was recycled.
- Harvard University operates an extensive campus recycling program that collects and recycles paper, cardboard, glass, metal, plastic, telephone directories, leaves, food waste, and wooden pallets. In 2000, Harvard composted 685 tons of food waste, landscape trimmings, and laboratory animal bedding; this was up from 340 tons in 1999.
- MIT expanded its campus recycling program in 2000. Recycling rates were increased from 5% of total waste in January 2000 to 18% by November of 2000. A food waste program was started that composts four tons of food a month. MIT also initiated a construction debris recycling program and a yard waste recycling program.

Proposed Actions

Short-term

- Carry out projects to increase participation in existing recycling programs using community-based social marketing techniques, starting with a pilot project. (See Section 8 for a description of community-based social marketing.) [G]
- Facilitate construction and demolition waste recycling. The state is planning to implement a construction and demolition debris disposal ban by 2003. The City can help contractors prepare for it by requiring a construction and demolition debris recycling plan as a condition of receiving a building permit. [G]

Medium-term

- Conduct waste composition studies every two years to develop information about which new portions of the waste stream to target for recycling or reduction and to evaluate the success of the current program. The study should examine the waste streams from residences, City government buildings, schools, and the commercial sector across all the seasons of the year. [G]
- Expand electronics recycling to include printers and other computer peripherals, as well as old phones, VCRs, stereos, and other electronic equipment. [G,B]

Long-term

- Develop a program to ensure that commercial waste paper is being recycled. Since 67% of Cambridge businesses provide professional, business, real estate, or insurance services, commercial waste paper is undoubtedly the largest portion of the commercial waste stream by far. The program should be based on a monitoring program and application of the Recycling Ordinance requirements. [G,B]
- Facilitate commercial food waste collection. This would help Cambridge businesses and institutions prepare for a state ban on food waste disposal that should go into effect soon under the Solid Waste Master Plan. Large institutions with food services have opportunities to efficiently divert food waste to composting facilities. Appropriate disposal facilities need to be identified. [G,B,I]
- Conduct a thorough composition study of the residential waste stream to assess the feasibility of a residential food waste collection program. Picking up food waste, yard waste, and cardboard in the same packer trucks should be considered. [G]
- Develop a program to pick up used clothing for recycling at the curb. Used clothing can comprise up to 6% of the waste stream. [G]

Strategy 3: Implement Environmentally Preferable Purchasing

Purchasing products with recycled content is essential to support a market for recycled waste material.

Actions: 1990-2001

- The City established a “buy recycled paper” policy in 1998.
- MIT initiated a “green goods” procurement program in 2000 that increased recycled paper (i.e., 30% to 50% recycled content, chlorine-free) use from less than 5% to 64% of total paper use on campus. The campus copy center’s recycled paper use constitutes over 90% of its paper use.

Proposed Actions

Short-term

- Reevaluate the City’s system for tracking recycled and non-recycled paper and plastic purchases to ensure accurate recording of the quantities purchased and set goals for increasing the percentage. Work with the school department to accomplish the same steps. [G]
- Work with stores to develop and use point-of-sale reminders to customers to purchase recycled products. [G, B]